GROUND WATER SURVEY

CLARENCE TOWNSHIP
HAMLET ST. PASCAL de BAYLON

1976

Ministry
of the
Environment

Ontario

The Honourable
George A. Kerr, Q.C.,
Minister

Everett Biggs,
Deputy Minister

MINISTRY OF THE ENVIRONMENT

GROUND WATER SURVEY

CLARENCE TOWNSHIP
HAMLET ST. PASCAL de BAYLON

I. R. Steltner

1976

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GROUND WATER SURVEY

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HAMLET ST. PASCAL de BAYLON

INTRODUCTION

A ground water survey was carried out at the Hamlet of St. Pascal de Baylon by the Ground Water Development Section to determine availability of local ground-water resources and the feasibility of developing a ground water source for municipal water supply.

The study is confined to a 2 miles (3 km) radius of the Hamlet of St. Pascal. An office study of the local water-well records, compilation of previous studies of the area and a review of geologic reports provided basic data. A field reconnaissance was conducted to confirm and observe the topographic and geologic aspects of the area. Water well samples were collected from 17 wells to determine the existing chemical and bacteriological quality of the ground water.

Well records included in this study are listed in Table 1 and are located on Figure 1. Water sample analyses are summarized in Table 2.

EXISTING SUPPLY AND FUTURE REQUIREMENTS

The existing water supply system utilizes two reservoirs each with a 3200 cu. ft. (91 cu. m) capacity to collect spring water and surface drainage. The raw water is pumped from the first reservoir through a pressure sand-filter into the second reservoir and is chlorinated before entering the distribution system. The pumping capacity of the system is about 17 igpm (77 l/m). Although actual consumption figures are not available, the system supplies water to about 70 homes including 9 farms, serving a total population of about 200 persons. Assuming a population of approximately 350 persons and a per capita consumption of 80 igpd (360 l/d) average and 240 igpd (1080 l/d) maximum, the requirements for the community will be approximately 20 igpm (90 l/m) average and 58 igpm (264 l/m), respectively.

PHYSIOGRAPHY

The Hamlet of St. Pascal de Baylon is situated on a flat low lying clay plain. To the east of St. Pascal a fine sand formation overlies the clay plain.

To the northwest, outcrops of limestone of the Ottawa formation occur. Spring flooding of this area is common because of the poor drainage afforded by the clay deposits and the low topographic relief.

BEDROCK

Limestone & Shale

The two main rock types underlying the St. Pascal area are the limestones of the Ottawa and Eastview Formation and the younger black shales of the Billings Formation. Both rock types were lain down during the Ordovician Period in a succession of shallow warm marine waters followed by a recession of the seas and consolidation of the deposits. Later considerable tectonic activity and subsequent faulting created a complex distribution of limestone and shale formations. (Drawing 2).

According to A. Wilson (1946, GSC Map 852A), St. Pascal occurs at the junction of three faults as shown in Drawing 2. The central block subsided relative to the surrounding area. With ensuing erosion the shales were worn away exposing older limestone encircling a section of younger shales. Based on well record information, the section underlying St. Pascal and the entire southern portion of the immediate study area is predominantly shale. One well record (No. 198, Table 1) reports a thickness of 180 feet of shale above limestone. Ottawa limestones have been located in outcrops occurring about one mile (2½ km) northwest of St. Pascal.

Bedrock topography (Drawing 2) is controlled mainly by the differential erosion of the resistant limestones and the friable shales and their relative placement after faulting disrupted the area. The north section of the study area is occupied by a bedrock high, exposing limestones at the surface and can be generally located at an elevation of about 100 feet above mean sea level.

Hydrogeology

Limestones generally have good permeability and hydraulic conductivity but tectonic activity in the St. Pascal area destroyed much of the primary porosity and joints are sealed with infilling of calcite and other materials. As a result, the Ottawa and Eastview limestones in the study area produce low

yield domestic wells. Similarly, the initially poorly permeable shale formations showed a further reduction of permeability and water yielding capabilities of the bedrock.

In the St. Pascal area, water bearing formations in the bedrock are encountered at depths of less than 50 feet of rock penetration. Approximately 44% of the 33 well records reviewed encountered a low yield aquifer within the first 15 feet (4½ m) associated with local fracture zones. The average adjusted theoretical yield of wells penetrating the Ottawa and Eastview limestones is 20 gpm and that of wells penetrating the shales is 12 gpm (54 l/m). The yields are not sufficient to sustain a high capacity municipal well supply. Wells having a theoretical yield greater than 50 gpm (227 l/m) are situated relative to the limestone outcrop area northwest of St. Pascal.

OVERBURDEN

Clay & Basal Gravel

St. Pascal is located on a clay plain. The clay sequence was deposited during the Pleistocene Epoch in shallow seas and has a developed thickness of up to 180 feet (55 m).

Within the clay sequence, coarse gravel lenses of limited extent have been identified. These lenses are often unsaturated because they are usually only a few feet thick and are surrounded by low permeability clays.

Basal sands and gravels, occurring intermittantly between the bedrock surface and the clay sequence are patchy lenses and are observed to have a maximum thickness of 8 feet (2m). Low yield domestic wells utilize saturated portions of this aquifer.

Hydrogeology

Of the thirty-three well records reviewed, only 8 located sufficient water within saturated basal gravels. Another thirteen wells located basal gravels which were unsaturated and penetrated to the underlying rock formation to find sufficient supply.

The average adjusted theoretical yield of wells finished in the basal gravel

is 20 gpm. This is similar to the yield from the first 15 feet (4½ m) of the limestone aquifer.

Considering the limited thickness and patchy distribution of the saturated basal gravel aquifer, the storage is severely limited. The perennial yield therefore are also expected to be severely restricted to yields less than 20 gpm, indicating that high capacity municipal wells cannot be developed utilizing this aquifer.

GROUND WATER QUALITY

A total of 17 wells within a 2-mile radius of St. Pascal were sampled for chemical and biological quality (Table 2 & 3). In the area to the northwest of St. Pascal, limestone wells having theoretical yields of greater than 50 gpm (227 l/min) showed chloride concentrations in excess of 250 ppm. The water is therefore unsuitable for human consumption according to M.O.E. drinking water objectives.

Associated with the high chloride concentrations high sodium concentrations and distinct yellow colouration further support the unsuitability of the water for municipal purposes.

Where the theoretical yield of the wells falls off, the water quality in general improves. The area due west of St. Pascal appears to have water quality suitable for domestic low capacity wells. Because the chemical water quality is controlled by the subterranean geological rock types which comprise the aquifer, the impact of large capacity wells on aquifers in the St. Pascal area may be eventual deterioration of the water quality. Iron concentrations are found to usually exceed the 0.3 ppm Fe standard set by M.O.E. Concentrations as high as 2.4 ppm Fe have been reported (Table 2).

Although minimal bacterial concentration have been revealed by the bacteriological analyses (Table 3), the water appears within permissible criteria for human consumption at the time of sampling. A single sample is inconclusive as to the overall quality of the water. As the seasons progress, the summer usually brings on increasing biological activity. It can be shortlived, but if persistant, measures

to sterilize the water should be taken.

From the assemblage of bacteria (streptococcus) present, it is evident that most water supplies are susceptible to surface contamination and may be influenced by the location and drainage of the septic systems. Recalling that St. Pascal is located on a clay plain, the septic tanks may not be constructed in material affording the best drainage and effluent renovation.

SUMMARY AND CONCLUSIONS

Two main aquifers in the St. Pascal area have been identified; one within the basal gravels just above the bedrock and another within the bedrock fractures less than 15 feet (4½ m) of rock penetration.

The two aquifers are likely hydraulically connected and similar yields may be obtained from each.

The basal gravels are thin, sporadic in occurrence and are composed of material that impart poor hydraulic properties to the aquifer.

Similarily the limestone and shales in the bedrock have poor porosities as the result of recrystallization and infilling of pores and fractures.

The net result is that conditions in the overburden and bedrock are suitable mainly for low yield wells. In certain locations theoretical yields of 20 to 50 gpm are indicated. These areas, however, are coincident with poor quality water, mainly high chlorides and sodium.

In light of quantity and quality considerations, it is concluded that the probability of establishing a municipal well supply source in the St. Pascal area is very remote.

Low yield domestic wells may be feasible in the area in terms of quantity and quality. However over-pumping of the aquifer by the domestic wells could result in deterioration of the water quality with time. The use of individual domestic wells is therefore a reasonable alternative for supplementing existing water supply.

RECOMMENDATIONS

Because the ground water conditions prevailing in the St. Pascal area are not adequate for municipal wells, we recommend that an alternative source of supply must be considered. Domestic wells are suggested as one possible alternative.

I. R. Steltner

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Project Co-ordination Branch.

T. J. Yakutchik

APPROVED BY: T. J. Yakutchik, Manager,
Ground Water Development Section,
Project Co-ordination Branch.

IRS/af
3/8/76

[redacted] Ministry of the Environment Ontario [redacted]

1

Table Summary of Water Well Records

Dat[redacted]

Prepared by

Well No	Location and Elevation	con	lot	Owner	Driller	year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm) (hrs)	Pumping Level (feet)	Quality	Use	Remarks Log etc
1078	TWP OF CLARENCE 200	I	14	R. GAREAU	CHARBONNEAU	68	●	2	67	10	6 / 2	25	FR	D S	0 cl60 cl&gr67 # 67
1062	255	II	3	M. DUQUETTE	GAUTHIER	68	●	5	160	20	10 / 2	60	FR	D S	0 cl140gr 155 ls160 # 155
1375	200	II	7	U. LALONDE	CHARBONNEAU	71	●	2	245	23	4 / 2	45	FR	S	0 cl75 ls w/sh layers 245 # 245
188	245	II	2	A. GALLANT	CHARBONNEAU	64	●	2	218	60	8 / 2	80	FR SUL (faint)	D S	0 cl157 gr 166 ls218 # 218
189	230	III	3	SS # 11	CHARBONNEAU	60	●	2	193	30	7 / 4	70	FR sul (slight)	PS	0 cl&d10 cl119 ls198 # 198
190	230	III	3	Z. BEAUCHAMP	CHARBONNEAU	63	●	2	132	22	7 / 2	25	FR	D S	0 cl125 gr128 ls132 # 152
1194	230	III	4	R. GUINDON	CHARBONNEAU	69	●	5 1/2	175	75	7 / 3	140	FR	D S	0 sd10 cl150 fsd168 ls175 # 175
191	200	III	3	A. BEAUCHAMP	CASSETTE	67	●	3	143	31	8 / 3	45	SUL.	D S	0 cl43 sd, [illegible] cl128 ls143 # 143
192	195	III	4	R. BEAUCHAMP.	CHARBONNEAU	65	●	2	116	16	8 / 2	20	FR	D S	0 cl105 gr 112 ls116 # 116.
193	195	III	5	A. DUQUETTE	CHARBONNEAU	65	●	2	123	16	8 / 2	40	FR	D S	0 cl66 ls123 # 123
1369	210	III	5	H. DUQUETTE	CHARBONNEAU	71	●	2	110	18	5 / 2	30	FR	S	0 Q sd20 cl68 gr73 ls110 # 110
194	190	III	7	C. SAVAGE	CHARBONNEAU	63	●	2	40	1	10 / 2	20	FR	D S	0 cl30 gr,sd 36 ls40 # 40

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Ontario

Table Summary of Water Well Records

Dat[redacted]

Prepared by

Well No	Location and Elevation	con	lot	Owner	Driller	year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm)(hrs)	Pumping Level (feet)	Quality	Use	Remarks Log etc
195	190	III	7	J. GODIN	CHARBONNEAU	65		2	53	10	10 / 2	25	FR	D S	0 cl48 gr51 lo53 # 53
196	200	III	8	R. DAOUT	CHARBONNEAU	57		2	182	15	5 / 3	40	SUL	D S	0 sd3 cl60 lo182 # 182
197	165	IV	10	V. PAQUETTE	CHARBONNEAU	66		2	57	FLOW @1	8 / 8	20	FR	D	0 cl50 csogr57 # 57
198	170	III	11	C. LALONDE	CHARBONNEAU	60		2	264	7	9 / 3	50	FR	COM	0 cl50 gr58 slate 240 lo264 # 264
1354	175	III	11	HILLSIDE CHEESE	DUFRESNE	71		6	240	23	4 / 1	240	FR	COM.	0 sd12 cl38 csogr; sd41 41 hp60 sh240 # 65
199	170	III	11	R. OUELETTE	CHARBONNEAU	64		6	300	—	–	DRY	–	AB	0 ob60 sh, slate 300 # —
200	170	III	16	A. GAGNE	CHARBONNEAU	65		2	95	4	10 / 2	30	FR	D S	0 cl55 gr73 slate 95 # 95
1281	175	III	19	A. LEGAULT	CHARBONNEAU	70		2	110	4	10 / 2	20	FR	S	0 cl100 lo110 # 110
201	190	IV	3	R. HUPÉ	CHARBONNEAU	63		5½	100	FLOW	7 / 3	60	FR	D S	0 cl5 sd50 lo100 # 100
1187	190	III	4	S. MINOR	CHARBONNEAU	69		2	73	FLOW	8 / 2	20	FR	D	0 cl70 csogr73 # 73
202	195	IV	5	# 24 SCHOOL CLARENCE	CHARBONNEAU	57		2	65	6	7 / 5	8	FR	D	0 t2 cl60 lo65 # 65
1559	190	IV	7	M. DUQUETTE	GAUTHIER	73		5	46	1	18 / 2	10	FR	S	0 cl30 sd40 gr46 # 46

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Table Summary of Water Well Records

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Prepared by

Well No	Location and Elevation	con	lot	Owner	Driller year	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm) (hrs)	Pumping Level (feet)	Quality	Use	Remarks Log etc
203	200	IV	10	R. SAUMUR	CHARBONNEAU 62	●	2	70	18	8 / 2	40	FR	D S	0 cl 55 l 70 #70
208	190	V	5	J. BEAUCHAMP	CHARBONNEAU 67	●	2	25	4	5 / 3	15	FR	D	0 cl 17 gr 25 #25
211	195	V	6	F. PLANTE	CHARBONNEAU 62	●	2	35	6	8 / 1	20	FR	D S	0 cl 15 f gr 30 ls 35 # 35
1110	195	V	6	BELL CANADA	GAUTHIER 69	●	5	55	5	1½ / 2	45	FR.	D	0 hp 22 ls 55 #40, 45.
212	195	V	7	C. HUPPÉ	CHARBONNEAU 64	●	2	88	FLOW	8 / 2	20	FR	D S	0 cl 60 gr, bldr 82 ls 88 #88
213	195	V	7	H. DONAT	CHARBONNEAU 62	●	2	35	6	8 / 1	20	FR	D S	0 cl 15 f gr 30 ls 35 #35
1483	200	V	10	P. BAUMUR	CHARBONNEAU 72	●	2	98	20	7 / 2	50	FR	D	0 cl 10 sd 50 cl 77 77 sd gr 85 slate 98 #98
1193	200	V	10	L. SAUMUR	CHARBONNEAU 69	●	2	96.	25	10 / 2	45	FR	D	0 cl 88 slate 96 #96.
214	200	V	8	H. GODIN	CHRISTY 50	●	6	89	15	2½ / 2	23	FR	D S	0 tl cl 84 gr 89 cugr- # 89
215	200	V	13	SS #13 SCHOOL	CHARBONNEAU 60	●	4	310	FLOW @ +2	8 / 3	–	FR	PS	0 loam 2 cl 22 sd 25 25 shale slate 310 # 310
216	185	V	13	F. OUELLETTE	CHARBONNEAU 63	●	2	75	10	7 / 2	20	FR	D	0 cl 45 cugr 75 # 75
217	190	V	17	J. ROY	CHARBONNEAU 57	●	2	127	7	5 / 3	18	FR	D	0 sd 3 cl 60 ls 127 #127

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Table Summary of Water Well Records

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Prepared by

Well No	Location and Elevation	con	lot	Owner	Driller (year)	Well Type	Well Diameter (inches)	Depth (feet)	Static Level (feet)	Pumping Test (gpm) (hrs)	Pumping Level (feet)	Quality	Use	Remarks Log etc
1039	220	VI	11	M. GERARD	BOURGEOIS 68	ꝭ	6	146	3	5 / 1	20	FR	D S	0 Dab12 cl125 gr127 127sh146 #140
1426	205	IV	16	M. LEPAGE	1555 73	ꝭ	2.	123	14	8 / 2.	40	FR.	D	0 cd20 cl86 gr96 cl123 #123
1479	200	IV	17	A LEPAGE	CHARBONNEAU 1504 72	ꝭ	2.	123	12	5 / 2	45	FR.	D	0 cd12 cl80 cd, gr 89 cl 123 #123
386	N. PLANTAGENET 270	III	21	H. BISSONETTE	CHARBONNEAU 64	ꝭ	5½	144	30	18 / 4	50	FR SL. SALT	D	0 cl130 Bcd133 sh144 #144
862	275	III	20	M. LARUSSA	CASSETTE 71	ꝭ	8	231	36	5 / 3½	36	SALT	D	0 cd15 cl167 sh231 #228

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Table Summary of Water Analyses

ST PASCAL - BAYLON G.W.

Prepared by [illegible]

Source and Number	Location	Date Sampled	pH	Colour Hazen Units	Turbidity Jackson Units	Specific Conductance mmhos at 25°C	Total Dissolved Solids (ppm)	Total Hardness as $CaCO_3$ (ppm)	Alkalinity as $CaCO_3$ (ppm)	Chloride (Cl)	Sulphate (SO_4)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potasium (K)	Free Ammonia (N)	Total Kjeldahl (N)	Nitrite (N)	Nitrate (N)		Remarks
										Chemical Constituents in parts per million (ppm)												
1375	1 U. LALONDE	MAR 9/76	7.0			127	90	54	·37	3	14	1.4	14	5	3	2.1	·2	·7	<.01	·7		[illegible] - 245
1194	2 R. GUIDON	MAR 9/76	8.4			3050	1890	96	1078	415	25	1.1	6	20	740	18	2.1	3.4	<.01	·1		[illegible]
192	3 B. SIMONEAU	MAR 9/76	7.2			1010	620	420	380	69	80	.05	86	50	70	3.8	<.1	·5	.01	2.0		[illegible]
1559	4 M. DUQUETTE	MAR 9/76	8.4			3350	1980	112	938	579	25	.60	6	24	760	17	1.8	2.8	<.01	<.1		[illegible]
1193	5 L. SAUMURE	MAR 9/76	7.9			670	400	216	361	16	3	.15	29	35	77	10	·7	1.1	<.01	<.1		[illegible] - 96
203	6 R. SAUMURE	MAR 9/76	8.1			720	470	152	392	16	3	.05	16	27	120	9.7	·7	1.1	<.01	<.1		[illegible]
216	7 LACROIX (SPRING)	MAR 9/76	7.7			110	90	52	42	2	11	.10	14	4	2	·8	<.1	·3	<.01	<.1		[illegible]
1426	8 M. LEPAGE	MAR 9/76	9.3			640	420	3	306	25	3	.10	<1	<1	160	2.7	·5	·8	<.01	<.1		86 - 123
197	9 H. PAQUETTE	MAR 9/76	8.9			1140	745	6	546	49	4	<.05	2	<1	290	3.8	·2	·5	<.01	<.1		[illegible]
196	10 R. DEAULT	MAR 9/76	7.4			630	400	340	336	7	17	.05	78	35	16	3.0	<.1	·3	<.01	·6		[illegible]
195	11 R. LABELLE	MAR 9/76	8.4			3700	2280	120	907	688	35	1.20	5	26	830	18	1.8	2.9	<.01	<.1		[illegible] 53
202	12 A. GAUVREAU	MAR 9/76	8.4			2650	1700	82	976	340	50	.20	4	18	660	18	1.9	2.9	<.01	<.1		[illegible]

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Table Summary of Water Analyses

Prepared by [illegible]

2 ST PASCAL – BAYLON

Source and Number	Location	Date Sampled	pH	Colour Hazen Units	Turbidity Jackson Units	Specific Conductance mmhos at 25°C	Total Dissolved Solids (ppm)	Total Hardness as $CaCO_3$ (ppm)	Alkalinity as $CaCO_3$ (ppm)	Chloride (Cl)	Sulphate (SO_4)	Iron (Fe)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potasium (K)	Free Ammonia	Total Kjeldahl	Nitrite	Nitrate		Remarks
										Chemical Constituents in parts per million (ppm)												
A	13 TOWN SUPPLY	MAR 9/76	6.7			80	105	27	38	15	12	1.2	8.5	1.4	7.	.9	.1	1.2	<.01	.1		Surface water
1354	14 COMMUNITY CTR	MAR 9/76	8.9			2100	1230	52	356	468	4	.40	6	9	470	4.6	.5	.7	<.01	<.1		SC – 65
385	15 H. BISSONETTE	MAR 10/76	8.1			8000	4780	367	1234	2120	13	.60	10	83	1800	41	4.7	5.6	<.01	<.1		SC – 144
862	16 M. LARAUSA	MAR 10/76	7.9			11,200	6650	564	1268	3150	29	2.4	24	123	2500	59	7.0	7.7	<.01	<.1		SC – 228
1281	17 E. LEGAULT.	MAR 10/76	7.6			740	485	244	188	68	65	.15	80	11	46	2.3	<.1	.9	.16	5.0		[illegible]

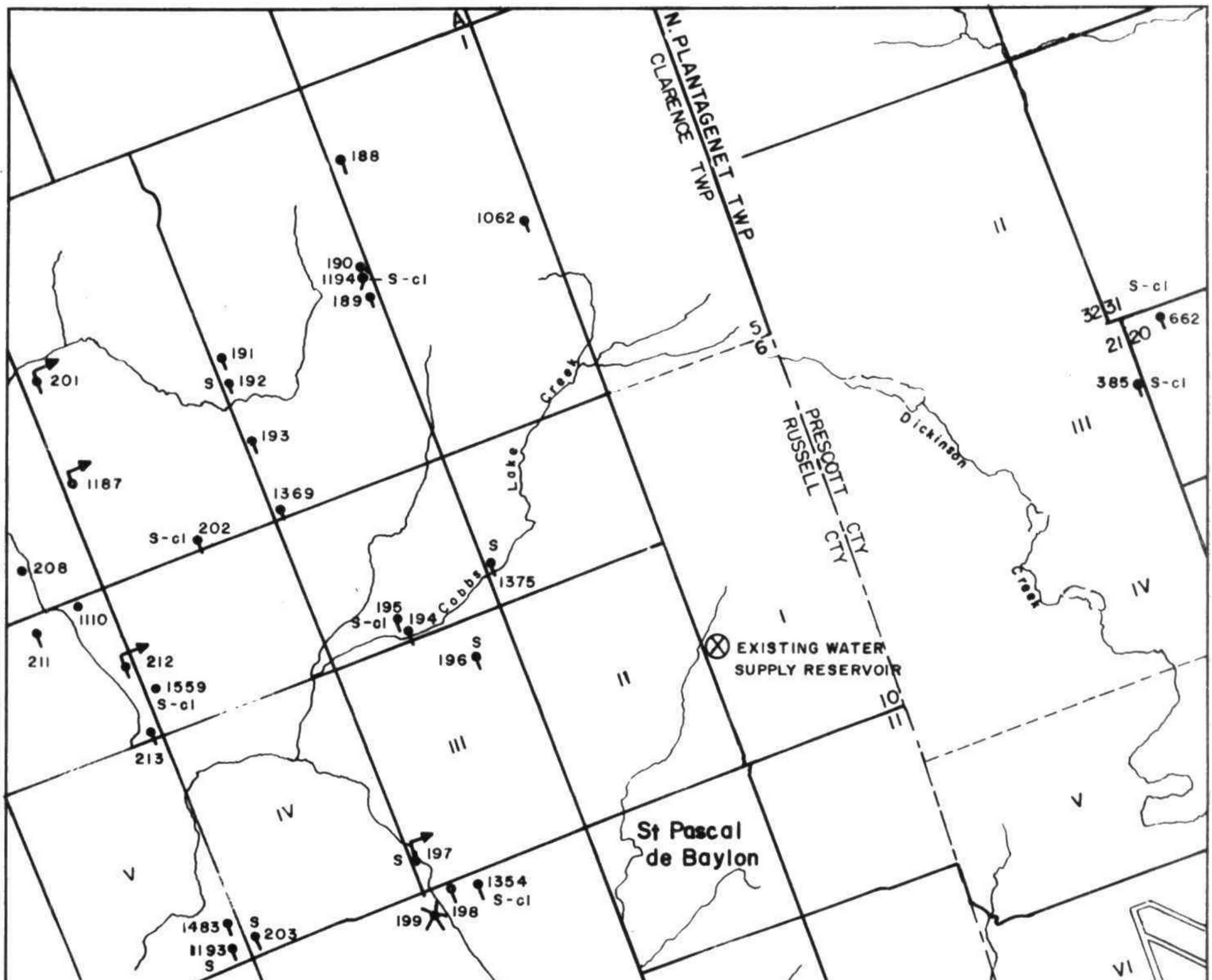
TABLE 1 SUMMARY OF BACTERIOLOGICAL RESULTS ST PASCAL - BAYLON

PREPARED BY [signature]

LOCATION	DATE	FECAL COLIFORMS	FECAL STREPTOCOCCUS	TOTAL COLIFORMS	BACKGROUND COLONIES
1375 1 U. LALONDE	Mar 9/76	0	12	18	2300
1194 2 R. GUIDON	"	0	<4	0	27,000
192 3 B. SIMONEAU	"	0	<4	0	8
1559 4 M. DUQUETTE	"	0	<4	0	8
1193 5 L. SAMMUEL	"	0	<4	0	0
203 6 R. SAMMUEL	"	0	<4	0	1320
216 7 LACROIX (SPRING)	"	0	<4	0	8
1426 8 M. LEPAGE	"	0	<4	0	0
197 9 V. PAQUETTE	"	0	<4	0	3100
196 10 R. DEAULT	"	0	<4	0	6
195 11 R. LABELLE	"	0	<4	0	6300
202 12 A. GAUREAU	"	0	<4	0	6000
A 13 TOWN SUPPLY	"	0	<4	0	0

2 TABLE SUMMARY OF BACTERIOLOGICAL RESULTS ST. PASCAL - BAYLON. PREPARED BY S.S.

LOCATION	DATE	FECAL COLIFORMS	FECAL STREPTOCOCCUS	TOTAL COLIFORMS	BACKGROUND COLONIES
1354 14 Community Ctr.	Mar 9/76	0	<4	0	20
385 15 H. Bissonette	Mar 10/76	0	4	0	32
862. 16 M. Lafleusa	"	0	8	2	14
1281 17 E. Legault	"	108	<4	1000	1200



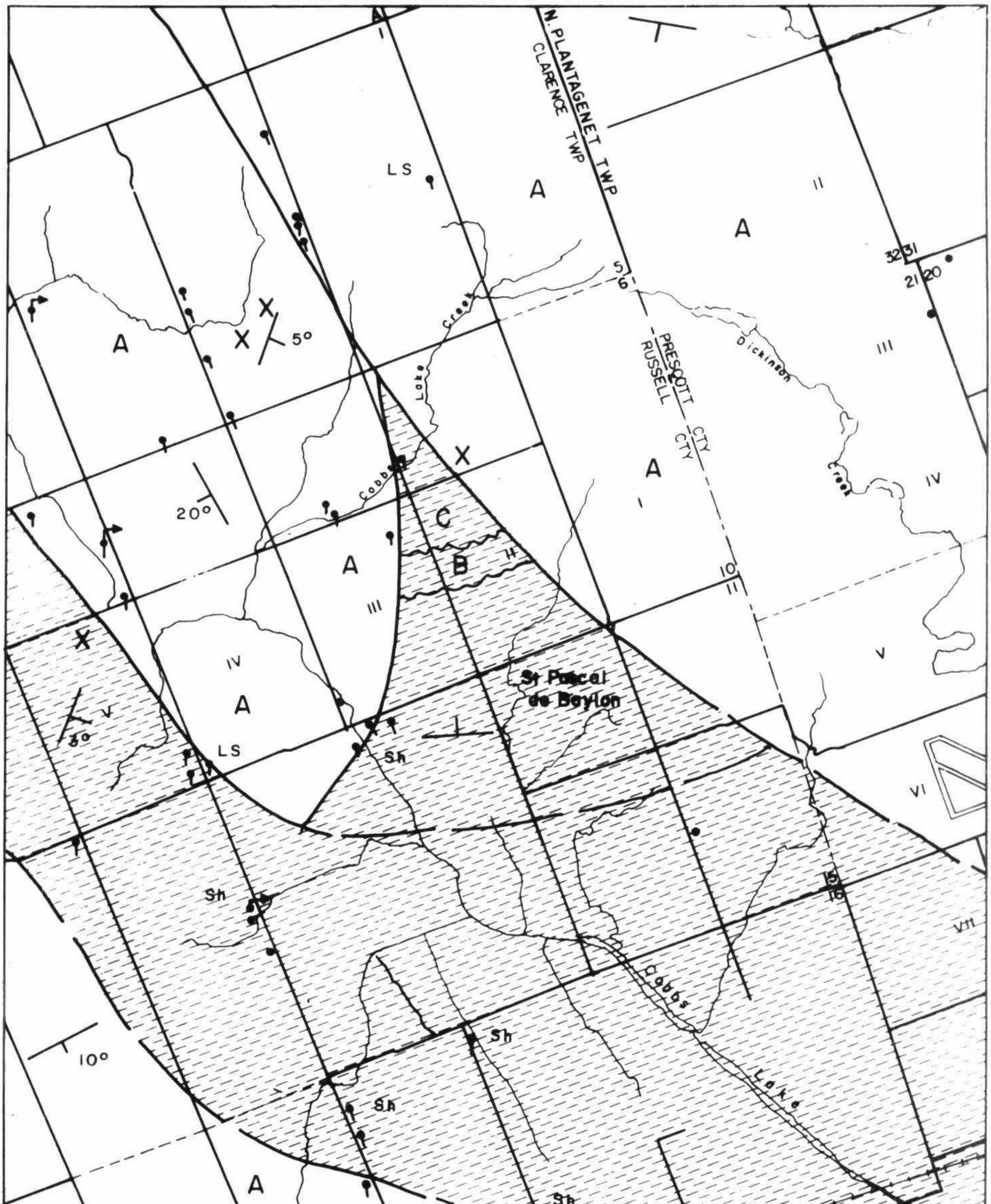
KEY

- BEDROCK WELL
- ABANDONED WELL
- OVERBURDEN WELL
- FLOWING WELL
- S WATER SAMPLE SITE
- cl HIGH CLORIDE
- X DRY WELL

MINISTRY OF THE ENVIRONMENT

WATER WELL SAMPLE LOCATIONS
ST. PASCAL - CLARENCE TWP
GROUND WATER SURVEY

SCALE 1: 50,000	
DRAWN BY I. S.	DATE MAY 1976
CHECKED BY	DRAWING NO. 1



LEGEND

ORDOVICIAN

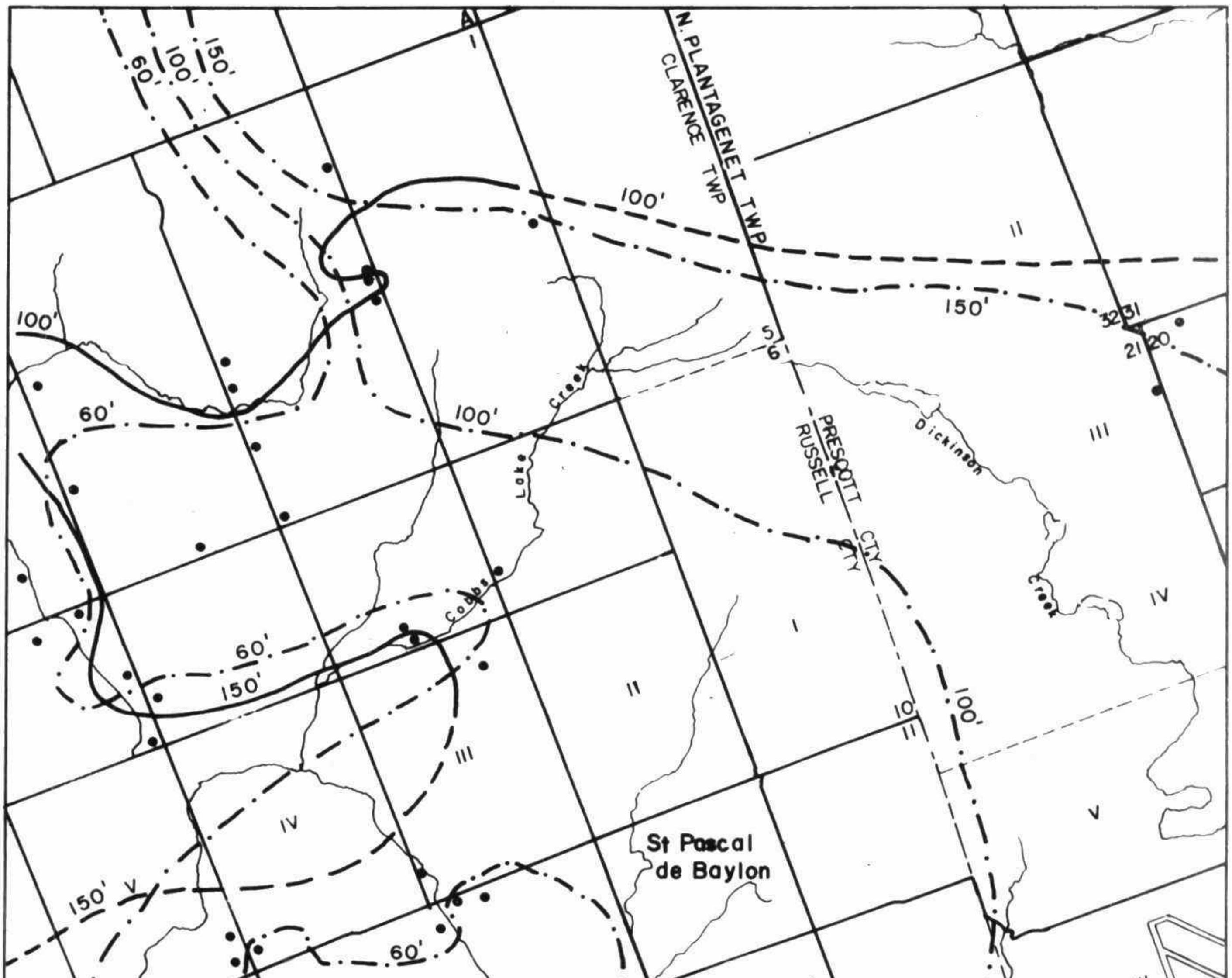
C	BILLINGS - BLACK SHALE W. BRN SHALE
B	EASTVIEW - DARK LS W. SOME SHALE
A	OTTAWA - COBOURGBEDS - LS
X	OUTCROP
Sh	SHALE
LS	LIMESTONE
	FAULT
	INCLINED BEDDING

AFTER: A.E. WILSON 1946 GSC MAP 882 A

MINISTRY OF THE ENVIRONMENT

BEDROCK GEOLOGY
ST. PASCAL - CLARENCE TWP
GROUND WATER SURVEY

SCALE 1 : 50,000
DRAWN BY I. S.
DATE MAY 1976
CHECKED BY
DRAWING NO. 2



BEDROCK TOPOGRAPHY (ft. ABOVE MEAN SEA LEVEL)

OVERBURDEN THICKNESS (ISOPACH ft.)

MINISTRY OF THE ENVIRONMENT

BEDROCK TOPOGRAPHY &
OVERBURDEN THICKNESS
ST. PASCAL - CLARENCE TWP
GROUND WATER SURVEY

SCALE 1 : 50,000	
DRAWN BY I. S.	DATE MAY 1976
CHECKED BY	DRAWING NO. 3